

CLAIMS

What is claimed is:

1. An edge emitting laser with circular beam, comprising:

a substrate; and

5 an epitaxy structure, which is formed on the upper surface of the substrate to form a ridge waveguide and includes, from bottom to top, a bottom cladding layer, a bottom waveguide layer, a light-emitting layer, an upper waveguide layer, an upper cladding layer, and an electrode contact layer;

wherein the light-emitting layer is formed from a low-carrier-mobility material
10 that contains diluted nitrides, the ridge waveguide is formed by etching from the surface of the epitaxy structure through the light-emitting layer, and the low-carrier-mobility material is $\text{In}_v\text{Ga}_w\text{Al}_{1-v-w}\text{As}_x\text{P}_y\text{N}_z\text{Sb}_{1-x-y-z}$ with $0 < v, w, x, y, z < 1$.

2. The edge emitting laser with circular beam of claim 1, wherein the top surface of
15 the ridge waveguide is formed with an upper electrode layer and the back-side surface of the substrate is formed with a bottom electrode layer, trapping the electrical current to flow through the light-emitting layer of the ridge waveguide.

3. The edge emitting laser with circular beam of claim 1, wherein the upper electrode
20 layer is formed using a P-type metal and the bottom electrode layer is formed using an N-type metal.

4. The edge emitting laser with circular beam of claim 1, wherein the ridge waveguide is formed through lithography and etching processes.